Mobile App Development

Grade 10, 11, or 12

Prerequisite: Intro to Computer Programming or Visual Basic

Credit Value: 5

ABSTRACT

Mobile App Development exposes students to the iOS Developer Software that is used on many Smart Devices, including the iPhone and iPad. Students will code and develop working applications that satisfy both student interest as well as an identifiable need. In some instances, applications may be licensed, marketed and distributed through the Apple® iTunes Store.

Adopted by the Somerville Board of Education on March 22, 2016
### Mobile App Development
**Grades 10, 11, or 12**

<table>
<thead>
<tr>
<th>September</th>
<th>October</th>
<th>November</th>
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<tr>
<td>8.2.12.C.1-2, 6-7</td>
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<td>8.2.12.E.1-4</td>
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**Essential Question(s):**
- What is iOS and what elements of the operating system are important to understand before programming for it?
- How will the capabilities and power structures of a device dictate how an app will run?
- What unique objects and graphics need to be created for the interface of an app?
- What open source content is available for iOS developers?
- How can using a UI Navigation Controller enhance the user’s interaction with the app?
- How does NSNotification keep apps running smoothly when accepting input from the user?
- How are MVCs used to retrieve and display data?

**Content:**
- Introduction to the programming language of iOS
- Understanding how apps run and are displayed on iOS devices
- Develop ideas for an app that would be useful in the global marketplace
- View Controller Lifecycle (VCL) and its interaction with iOS
- Analysis of how multiple MVCs interact and how a UI Navigation Controller affects their interaction.

**Skills and Topics:**
- Introduce Object Oriented Design
- Describe elements of iOS including the Core OS, Core Services, media capabilities, and Cocoa Touch capabilities
- Comparisons of other operating systems to iOS
- Objective – C
- Create a list of ideas for unique apps or current apps that could be improved
- Develop storyboards of graphics and user interfaces
- Power management
- Screen resolution
- Creating objects and elements in iOS
- Dynamic Building
- Object typing, setting fonts
- Using open source iOS content
- Text fields
- Scrolling
- Creating View Controllers
- Using autorotation in code
- NSNotification
- Low memory situations
- Bronze, Silver, and Gold programming challenges
- Evil Knievel bus jump game
- Polymorphism with Controllers
- Multiple MVCs in an application
- Making a Generic Controller
- UI Navigation Controller
- Bronze, Silver, and Gold programming challenges
<table>
<thead>
<tr>
<th>programming language</th>
<th>Basic graphics</th>
<th>The concept of &quot;nil&quot; in computing language</th>
<th>Evil Knievel bus jump game</th>
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<tr>
<td>Attributed strings</td>
<td>File Access</td>
<td>Bronze, Silver, and Gold programming challenges</td>
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<tr>
<td>Card Matching Game program</td>
<td>Touch interfaces</td>
<td>Dividing objects in the Model-View-Controller pattern and how they interact.</td>
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**Integration of Technology:**
Computers, xCode, PowerPoint presentations, online resources and videos, blogs and articles, iOS devices for testing

**Writing:**
Journaling in Engineering notebook, writing of programming language

**Formative Assessments:**
Testing programs, homework, journaling, observation of student progress

**Summative Assessments:**
Computer based assessments, presentations of work, quizzes, final project

**Performance Assessments:**
Use of programming language

**Interdisciplinary Connections:**
Arts: Design elements are exemplified in the construction of user interfaces and objects  
Math: HSG.MG.A.3  
ELA: W.9-10.7

**21st Century Themes:**
- Global Awareness  
- Civic Literacy  
- Financial, Economic, Business, and Entrepreneurial Literacy  
- Health Literacy

**21st Century Skills:**
- Creativity & Innovation  
- Media Literacy  
- Critical Thinking & Problem Solving  
- Life and Career Skills  
- Information & Communication Technologies Literacy  
- Communication & Collaboration  
- Information Literacy

**Resources:**

**Careers:**
Applicable career options are discussed as they arise throughout the technology program. Career options include, but are not limited to, the following career clusters: Arts, A/V Technology, and Communications Career Cluster; Business, Management, and Administration Career Cluster; Education and Training Career Cluster; Government and Public Administration Career Cluster; Health Science Career Cluster; Hospitality and Tourism Career Cluster; Human Services Career Cluster; Information Technology Career Cluster; Law, Public Safety, Correction, and Security Career Cluster; Manufacturing Career Cluster; Marketing Career Cluster; Science, Technology, Engineering and Mathematics Career Cluster; Transportation, Distribution, and Logistics Career Cluster.
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### Essential Question(s):
- How should an app be designed to attend to the needs of the end user?
- How should files and data paths be arranged for the most efficient storage and retrieval?
- How can apps take advantage of the specific hardware built into the iOS device?
- What steps should be taken to ensure the highest level of security for the user and developer?
- What is important to consider when marketing an app on the iTunes Store?

### Content:
- Designing interfaces that are conducive to a user’s touch
- Organizing data for maximum efficiency
- Utilizing a device’s existing technology to enhance an app’s capability
- Safety and security while using devices and apps
- The steps needed to legally make an app available on the iTunes Store

### Skills and Topics:
- How apps can be built to react to users’ touch gestures
- Views (Hierarchical and UIWindow)
- Initializing a UIView
- Using coordinates to place objects
- Animation
- Custom views
- Bronze, Silver, and Gold programming challenges
- Evil Knievel bus jump game
- Protocols: How to make id safer for the user
- Passing a block of code as an argument to a method
- SQLite
- Writing an array or dictionary to disk
- Home Directory Layout
- File paths and data retrieval
- Archiving & unarchiving objects
- Bronze, Silver, and Gold programming challenges
- Evil Knievel bus jump game
- Sending and receiving Push Notifications
- Adapting design for iPad, iPhone, iPod Touch, Apple Watch
- Using a device’s GPS, accelerometer, and camera in applications
- Augmented reality using GPS
- Providing support features to the user
- Integrating with web services
- Connecting to the Cloud
- Mobile malware
- Debugging
- Customizable interfaces
- App security
- Protecting a device from unauthorized use
- Application deployment to the iTunes store
- Licensing and legal considerations
- Final project presentations
- Collection of items for personal digital portfolio
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